

**TRANSMITTAL OF APPEAL BRIEF**Docket No.  
84632-US1

In re Application of: Karen Swider Lyons et al.

Application No.	Filing Date	Examiner	Group Art Unit
10/693,845-Conf. #2813	October 20, 2003	T. M. Dove	1745

Invention: PLATINUM-IMPREGNATED HYDROUS TIN OXIDE CATALYSTS

**TO THE COMMISSIONER OF PATENTS:**Transmitted herewith is the Appeal Brief in this application, with respect to the Notice of Appeal filed: December 11, 2008.The fee for filing this Appeal Brief is \$ 540.00.☒ Large Entity ☐ Small Entity☒ A petition for extension of time is also enclosed.The fee for the extension of time is \$ 130.00.☐ A check in the amount of \_\_\_\_\_ is enclosed.☒ Charge the amount of the fee to Deposit Account No. 50-0281.☐ Payment by credit card. Form PTO-2038 is attached.☒ The Director is hereby authorized to charge any additional fees that may be required or credit any overpayment to Deposit Account No. 50-0281.  
This sheet is submitted in duplicate./Joseph T. Grunkemeyer/Joseph T. Grunkemeyer  
Attorney Reg. No. : 46,746  
US NAVAL RESEARCH LABORATORY  
4555 Overlook Ave, SW  
Washington, DC 20375  
(202) 404-1556Dated: March 9, 2009

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

---

In re Patent Application of:  
Karen Swider Lyons et al.

Application No.: 10/693,845

Confirmation No.: 2813

Filed: October 20, 2003

Art Unit: 1745

For: PLATINUM-IMPREGNATED HYDROUS TIN  
OXIDE CATALYSTS

---

Examiner: T. M. Dove

**APPEAL BRIEF**

MS Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Madam:

As required under § 41.37(a), this brief is filed more than two months after the Notice of Appeal filed in this case on December 11, 2008, and is in furtherance of said Notice of Appeal.

The fees required under § 41.20(b)(2) are dealt with in the accompanying  
TRANSMITTAL OF APPEAL BRIEF.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1205.2:

- |      |   |
|------|---|
| I.   | Real Party In Interest                        |
| II.  | Related Appeals and Interferences             |
| III. | Status of Claims                              |
| IV.  | Status of Amendments                          |
| V.   | Summary of Claimed Subject Matter             |
| VI.  | Grounds of Rejection to be Reviewed on Appeal |
| VII. | Argument                                      |

VIII.	Claims
Appendix A	Claims
Appendix B	Evidence
Appendix C	Related Proceedings

I. REAL PARTY IN INTEREST

The real party in interest for this appeal is:

The Government of the United States of America, as represented by the Secretary of the Navy

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 18 claims pending in application.

B. Current Status of Claims

1. Claims canceled: none
2. Claims withdrawn from consideration but not canceled: none
3. Claims pending: 1-18
4. Claims allowed: none
5. Claims rejected: 1-18

C. Claims On Appeal

The claims on appeal are claims 1-18

IV. STATUS OF AMENDMENTS

Applicant did not file an Amendment After Final Rejection.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 1 recites a chemical composition comprising the formula  $M-SnO_x \cdot yH_2O$ . M is a platinum group metal. The values of x and y are positive numbers. Paragraph 0008.

Independent claim 11 recites a device comprising: a cathode comprising the above chemical composition, an anode capable of catalytically oxidizing hydrogen, and an electrolyte in contact with both the cathode and the anode. Paragraph 0009.

Independent claim 15 recites a material comprising a conductive support and the above chemical composition. Paragraph 0010.

Independent claim 17 recites a method of electrochemical reduction comprising the steps of: providing a cathode comprising the above chemical composition, providing an anode, and contacting a substance to be reduced to the cathode. Paragraph 0011.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

- A. Claims 1, 2, 4, 10-12, 17, and 18 stand rejected under 35 U.S.C § 102(b) as allegedly anticipated by Watanabe et al. (*J. Electrochem. Soc.*, **130**, 59-64, (1983) (“Watanabe”)).
- B. Claims 1, 2, 4, 5, 12, 13, 15, and 17 stand rejected under 35 U.S.C § 102(b) as allegedly anticipated by Gardner et al. (*J. Phys. Chem.*, **95**, 835-883 (1991) (“Gardner”)).
- C. Claims 1, 2, and 4-16 stand rejected under 35 U.S.C § 103(a) as being allegedly unpatentable over Watanabe et al. (US 5,922,487, “Watanabe 487”) in view of Watanabe.
- D. Claim 3 stands rejected under 35 U.S.C § 103(a) as being allegedly unpatentable over Watanabe in view of Katayama et al. (*J. Phys. Chem.*, **84**, 376-381 (1980) “Katayama”)).
- E. Claim 3 stands rejected under 35 U.S.C § 103(a) as being allegedly unpatentable over Gardner in view of Katayama.

## VII. ARGUMENT

- A. A *prima facie* case has not been established in the rejection of claims 1, 2, 4, 10-12, 17, and 18 under 35 U.S.C § 102(b) as allegedly anticipated by Watanabe.

In order to make a *prima facie* case of anticipation, the reference must disclose each limitation of the claim. *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053, 814 F.2d 628, 631 (Fed. Cir. 1987). Among other deficiencies, the reference does not disclose the limitation in claims 1 (2, 4, and 10 dependent thereon), 11 (12 dependent thereon), and 17 (18 dependent thereon) that the composition comprises a hydrate of the form  $\text{SnO}_x \cdot y\text{H}_2\text{O}$ . Watanabe discloses platinum dispersed in tin oxide (abstract). No hydrate (i.e.,  $\cdot y\text{H}_2\text{O}$ ) form of tin oxide is disclosed. Although it is stated that “alkaline pretreatment of  $\text{SnO}_2$  causes the pH response of the electrode to be enhanced, evidently though a superficial hydration,” (p. 60, col. 1, lines 36-39) hydration is defined in Watanabe as formation of  $-\text{Sn}-\text{OH}$  (p. 60, col. 1, lines 38-39). The rejection characterizes this as containing  $y\text{H}_2\text{O}$  (page 2, lines 16-08). However, this is not the same as  $\text{SnO}_x \cdot y\text{H}_2\text{O}$ . Watanabe teaches hydrolysis of  $\text{Sn}=\text{O}$  bonds to produce the  $-\text{Sn}-\text{OH}$  hydrate (p. 60, col. 1, lines 39-40), not hydration.

The rejection cites a definition of hydration from Hawley’s Chemical Dictionary which precludes the splitting of the  $\text{H}-\text{OH}$  bond, and concluding that the formula stated in Watanabe,  $-\text{Sn}-\text{OH}$ , could have been written as  $\text{SnO}_x \cdot y\text{H}_2\text{O}$ . Office action of 06/12/2008, page 6, lines 11-17. However, the clause at p. 60, col. 1, lines 39-40 clearly states that a tin-oxygen double bond is converted to a tin-oxygen single bond, the oxygen becoming part of a hydroxyl group. The oxygen atom begins and ends this reaction bonded to the tin atom, without the addition of a whole water molecule. Any hydrogen added from a water molecule would require splitting an  $\text{H}-\text{OH}$  bond, contrary to the definition of hydration used in the rejection. Watanabe is not using the term “hydration” in the sense used in the rejection. The same paragraph of the reference goes on to explain that surface  $\text{Sn}-\text{OH}$  protons maybe replaced by  $\text{Fe(III)}$  or  $\text{Pb(II)}$ . If the interpretation in the rejection of  $\text{Sn}-\text{OH}$  were correct, the result of this replacement would be, for example,  $\text{SnO}_x \cdot y(\text{FeHO})^{+2}$ . This is not a plausible result.

As all the claim limitations have not been disclosed, a *prima facie* case of anticipation has

not been made.

- B. A *prima facie* case has not been established in the rejection of claims 1, 2, 4, 5, 12, 13, 15, and 17 under 35 U.S.C § 102(b) as allegedly anticipated by Gardner.

As in Watanabe, Gardner does not disclose a hydrate of the form  $\text{SnO}_x \cdot y\text{H}_2\text{O}$  as recited in claims 1 (2, 4, and 5 dependent thereon), 11 (12 and 13 dependent thereon) 15, and 17. Gardner discloses a  $\text{Pt/SnO}_x$  composition (abstract) and discloses “surface dehydration caused by the combination of surface hydroxyl groups and desorption of water” (p. 835, col. 1, lines 27-28). Although dehydration of the material is disclosed, this does not imply that the material had been a hydrate before the dehydration. The water is made from hydroxyl groups, not hydrate groups. There is no disclosure that there was ever a hydrate group present. The rejection stated that “ $\text{Pt/SnO}_2$  is humidified” (p. 3, line 4). Humidification would indicate merely that water molecules are present. This does not show the chemical reaction needed to form the presently claimed hydrate compound.

The rejection cites a definition of dehydration from Hawley’s Chemical Dictionary stating that it involves removal of one or more molecules of water from a chemical compound, and concluding that the compound of Gardner was a hydrate in order to undergo dehydration (p. 6, lines 20-22). The cited definition gives as an example, conversion of ethanol to ethylene ( $\text{CH}_3\text{—CH}_2\text{OH} \rightarrow \text{CH}_2=\text{CH}_2 + \text{H}_2\text{O}$ ). However, ethanol is not a hydrate of the claimed “ $\cdot y\text{H}_2\text{O}$ ” form. The definition of dehydration used in the rejection does not support the proposition that the dehydrated compound of Gardner had been a hydrate.

As all the claim limitations have not been disclosed, a *prima facie* case of anticipation has not been made.

- C. A *prima facie* case has not been established in the rejection of claims 1, 2, and 4-16 under 35 U.S.C § 103(a) as being allegedly unpatentable over Watanabe 487 in view of Watanabe.

In order to make a *prima facie* case of obviousness, there must be some rationale to support the rejection (*KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 82 U.S.P.Q.2d 1385 (2007)). The rationale put forth in the rejection is based upon Watanabe teaching hydrated Pt-SnO<sub>2</sub> (p. 4, lines 4-6). However, as explained above Watanabe does not disclose a hydrate as presently claimed. Watanabe 487 discloses only Pt/Sn alloys (abstract). No tin oxide or hydrates are disclosed. None of the references discloses the limitation in claims 1 (2 and 4-10 dependent thereon), 11 (12-14 dependent thereon), and 15 (16 dependent thereon) that the composition comprises a hydrate. As the rejection assumes that the limitation is disclosed in the references, no rationale for modifying the references in this way is put forth. As there is no rationale supporting the rejection, a *prima facie* case of obviousness has not been made.

- D. A *prima facie* case has not been established in the rejection of claim 3 under 35 U.S.C § 103(a) as being allegedly unpatentable over Watanabe in view of Katayama.

As explained above Watanabe does not disclose a hydrate as presently claimed. As stated in the rejection, Katayama discloses Pt/SnO<sub>2</sub> (p. 5, lines 8-9), which is not the same as the presently claimed hydrate. None of the references discloses the limitation in claim 1 (3 dependent thereon) that the composition comprises a hydrate. As the rejection assumes that the limitation is disclosed in the references, no rationale for modifying the references in this way is put forth. As there is no rationale supporting the rejection, a *prima facie* case of obviousness has not been made.



- E. A *prima facie* case has not been established in the rejection of claim 3 under 35 U.S.C § 103(a) as being allegedly unpatentable over Gardner in view of Katayama.

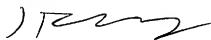
As explained above Gardner does not disclose a hydrate as presently claimed. As stated in the rejection, Katayama discloses Pt/SnO<sub>2</sub> (p. 6, line 1), which is not the same as the claimed hydrate. None of the references discloses the limitation in claim 1 (3 dependent thereon) that the composition comprises a hydrate. As the rejection assumes that the limitation is disclosed in the references, no rationale for modifying the references in this way is put forth. As there is no rationale supporting the rejection, a *prima facie* case of obviousness has not been made.

#### VIII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A. As indicated above, the claims in Appendix A include the amendments filed by Applicant on January 5, 2007.

Dated: March 9, 2009

Respectfully submitted,



Joseph T. Grunkemeyer  
Registration No.: 46,746  
US NAVAL RESEARCH LABORATORY  
4555 Overlook Ave, SW  
Washington, DC 20375  
(202) 404-1556  
(202) 404-7380 (Fax)  
Attorney For Applicant

**APPENDIX A**

**Claims Involved in the Appeal of Application Serial No. 10/693,845**

1. A chemical composition comprising the formula:  
$$M-SnO_x \cdot yH_2O$$
wherein M is a platinum group metal; and  
wherein x and y are positive numbers.
2. The chemical composition of claim 1, wherein M is platinum.
3. The chemical composition of claim 2, wherein composition comprises platinum in an amount greater than 0 to about 30 percent by weight.
4. The chemical composition of claim 1,  
wherein x is about 1 to about 2; and  
wherein y is greater than 0 up to about 2.
5. The chemical composition of claim 1, wherein the composition is combined with a conductive support.
6. The chemical composition of claim 5, wherein the combination of the composition and the conductive support comprises at least 20% by weight of the conductive support.
7. The chemical composition of claim 5, wherein the combination of the composition and the conductive support comprises at least 50% by weight of the conductive support.
8. The chemical composition of claim 5, wherein the conductive support is carbon black.
9. The chemical composition of claim 1, wherein the composition is substantially free of silica.

10. An electrode comprising the chemical composition of claim 1.
11. A device comprising:  
a cathode comprising a chemical composition comprising the formula:  
$$M-SnO_x \cdot yH_2O$$
  
wherein M is a platinum group metal; and  
wherein x and y are positive numbers;  
an anode capable of catalytically oxidizing hydrogen; and  
an electrolyte in contact with both the cathode and the anode.
12. The device of claim 11, wherein the device is a fuel cell.
13. The device of claim 11, wherein the cathode and the anode are on opposing surfaces of a proton-conducting membrane.
14. The device of claim 13, wherein the proton-conducting membrane comprises a perfluorosulfonic acid polymer.
15. A material comprising:  
a conductive support; and  
a chemical composition comprising the formula:  
$$M-SnO_x \cdot yH_2O$$
  
wherein M is a platinum group metal; and  
wherein x and y are positive numbers.
16. The material of claim 15, wherein the conductive support is conductive carbon.

17. A method of electrochemical reduction comprising the steps of:  
providing an a cathode comprising a chemical composition comprising the formula:  
$$M-SnO_x \cdot yH_2O$$
  
wherein M is a platinum group mctal; and  
wherein x and y are positive numbers;  
providing an anode; and  
contacting a substance to be reduced to the cathode.
18. The method of claim 17, wherein the substance to be reduced is oxygen.

**APPENDIX B**

No evidence pursuant to §§ 1.130, 1.131, or 1.132 is being submitted.

**APPENDIX C**

No related proceedings are referenced in II. above, hence copies of decisions in related proceedings are not provided.